# Fisheries 101

There's no denying it: ocean fishing has gotten more complex over the past few years. Aside from the usual concerns about weather and the tides, new and intricate fishing regulations have caused frustration and confusion among anglers. In particular, 2004 seems to have been a banner year for regulation changes in the recreational fishery for bottom-dwelling species, also known

*By Ed Roberts*

as "groundfish." The changes seemed to occur quickly and become extremely complex. Figuring out why requires a good understanding of how the marine recreational fishery is managed here in California.

**Canary rockfish (*Sebastes pinniger*), found off northern and central California, have been declared "overfished."** *DFG photo by Ed Roberts*

### The basics of groundfish jurisdiction

The conservation and management of marine fisheries within the territorial waters of the United States (from the beach to 200 miles offshore) is primarily the responsibility of NOAA Fisheries, an agency of the National Oceanic and Atmospheric Administration, under the Department of Commerce. The Magnuson-Stevens Fishery Conservation and Management Act, also known as the Magnuson Act, requires fisheries to be managed under federal fishery management plans (FMPs). The Pacific Fishery Management Council (PFMC), created under the Magnuson Act, develops the FMPs for the coastal fisheries for Washington, Oregon and California. Once the PFMC adopts a fishery management plan, NOAA Fisheries implements regulations meant to carry out the FMP's goals and objectives. State regulations for species managed under a federal FMP must be consistent with the federal regulations. Those species not included in a federal FMP are left exclusively to the states to manage under state-developed FMPs .

The Secretary of Commerce

**Young angler holds a vermilion rockfish (*Sebastes miniatus*) and a brown rockfish (*Sebastes auriculatus*) caught aboard a sportfishing vessel out of San Diego.** *DFG photo by Ed Roberts*

Bocaccio (*Sebastes paucispinis*). *Photo © Milton Love*

**Sanddab (*Citharichthys sp.*), a flatfish.** *Photo © Ron Owen*

approved and adopted into law the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) in 1982. The Groundfish FMP covers over 80 species of fish, including 12 species of flatfish (such as starry flounder and Pacific sanddab), six species of roundfish (such as lingcod and sablefish), six species of sharks and skates (such as spiny dogfish, leopard shark and big skate) and over 50 species of rockfish. The Groundfish FMP guides the management decisions of the PFMC with the intent to:

- Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent any loss of the habitat of living marine resources.
- Maximize the value of the groundfish resource as a whole.
- Achieve the maximum biological yield of the overall groundfish fishery, and promote recreational fishing opportunities.

The Groundfish FMP identifies management tools for the groundfish fishery, including harvest guidelines, resource allocation, area and depth restrictions, size limits, seasonal closures and gear restrictions. Often, as new scientific information becomes available or as catches during the year approach, reach or exceed allowable levels, it becomes necessary to make regulatory changes in order to remain in compliance with the Groundfish FMP.

### Overfished stocks

West Coast groundfish stocks and harvests have declined significantly since the early 1990s. These declines have been partially attributed to natural changes in oceanic conditions, poor recruitment of young fish and overfishing.

The Secretary of Commerce declared the West Coast groundfish fishery a disaster in 2000. Currently, nine species of groundfish have been declared overfished by NOAA Fisheries based on Groundfish FMP

criteria. The nine overfished species include Pacific whiting (hake), widow rockfish, darkblotched rockfish, Pacific ocean perch (these species are primarily taken in commerical fisheries), and canary rockfish, yelloweye rockfish, bocaccio, cowcod, and lingcod. Under the Groundfish FMP, the PFMC must monitor catches and take action to rebuild these stocks. The requirement to rebuild the overfished stocks not only restricts the allowable catch of the depleted species, but also limits fishing opportunities for the more abundant species that are found in close association with the depleted ones.

**Anglers aboard a party boat in Southern California bait up for bottomfish (groundfish).**

*DFG photo by Ed Roberts*

### Harvest limits

For some species, scientists are able to estimate the overall population size using mathematical models. These *stock assessments* can use many different sources of data to assess the health of a given stock, including commercial and recreational landings, fishing effort, the size and age structure of the stock, and life history information. Once the current status of a population is believed to be understood, fishery scientists estimate how many fish can be safely harvested, while maintaining a healthy population or rebuilding an overfished population.

When setting annual harvest limits, the PFMC considers the health status of a stock, and human socio-economic and cultural factors. Sometimes harvest limits can be broken down and applied to a very small geographic area. In some cases, the fish population crosses state borders, which means that the harvest limit applies to the entire area where the population is found. In this case, the actions of anglers in one state have consequences for anglers in another state.

Currently, 23 species managed under the Groundfish FMP are managed by the results of stock assessments. For those stocks that have not had assessments, the fishery managers of the PFMC have only limited data available to determine harvest limits, such as the catch history of the fishery. In these cases, adopting a low harvest limit reduces the risk that the stock will be accidentally depleted because of a lack of information on the level of catch that the stock can safely support. Often, harvest limits for these non-assessed species are combined with similar species occupying similar habitats to form aggregate harvest limits.

Once harvest limits have been established for species or species groups, the PFMC then divides this limit between the recreational and commercial portions of the fishery.

State management agencies often set harvest limits for species not managed under federal FMPs, following a similar process.

Photo © Sky Dalton

**Copper rockfish (*Sebastes caurinus*) are found from the Gulf of Alaska to central Baja California.**

**Rockfish.** *Photo © Christine Humphreys*

**Vermilion rockfish, often called "red snapper," are a popular species with saltwater anglers.**

*DFG photo by Ed Roberts*

### Creating sport fishing regulations

Fishery scientists and managers use statistical models to predict the catch for the coming year. Based on catch levels of previous years and knowledge of the fishery and the biology of the fishes, managers develop several options for protecting overfished stocks. Scientists and managers want to ensure that the sport catch stays within the established annual recreational harvest limits while providing as much fishing opportunity as possible. Combining these two goals creates complicated regulations.

Because many species of rockfish are difficult to distinguish from one another, and many healthy species co-exist with overfished species, it's difficult to limit the take of overfished stocks while still providing fishing opportunities for the others. Bocaccio (*Sebastes paucispinis*), a species of rockfish that has been declared overfished, is often caught by recreational anglers who fish for vermilion rockfish (*Sebastes miniatus*), which is believed to be at a healthy population level. To prevent the unintentional catch of bocaccio, managers must limit fishing for vermilion rockfish as well.

### Monitoring recreational catches

Fisheries biologists track commercial and recreational landings using various data sources. From 1980-2003 in California, recreational groundfish catches were estimated using the Marine Recreational Fisheries Statistics Survey (MRFSS). MRFSS was a federal program that combined catch composition information collected from an angler field survey with fishing effort information obtained from a telephone survey to generate an estimate of total sport catch.

In January 2004, the California Department of Fish and Game, in cooperation with the Pacific States Marine Fisheries Commission, implemented a new method to monitor California's sport catch called the California Recreational Fisheries Survey (CRFS). CRFS was developed in response to concerns expressed by both anglers and fishery

managers regarding the quality of data available to estimate sport catch throughout the year. CRFS combines elements of several separate programs and several new innovations into one program that will be used for management of all of the state's recreational finfish (fish with fins, as opposed to "shellfish") fisheries. The CRFS should provide more accurate and timely estimates of saltwater sport angler catch and effort, improving marine recreational fishery management.

### In-season changes

Adopted sport fishing seasons, depth-based closures, and bag limits may change from year to year. In addition to annual changes, recreational anglers face in-season regulation changes that occur over the course of the year. Two main factors dictate in-season regulation changes:

- Fishery data collected towards the end of one calendar year is often not available to fishery managers until the next calendar year. Managers then review the new data, and if necessary refine the estimates of total sport catch for the previous year. They may make adjustments to the statistical models used to make catch projections for the current year.

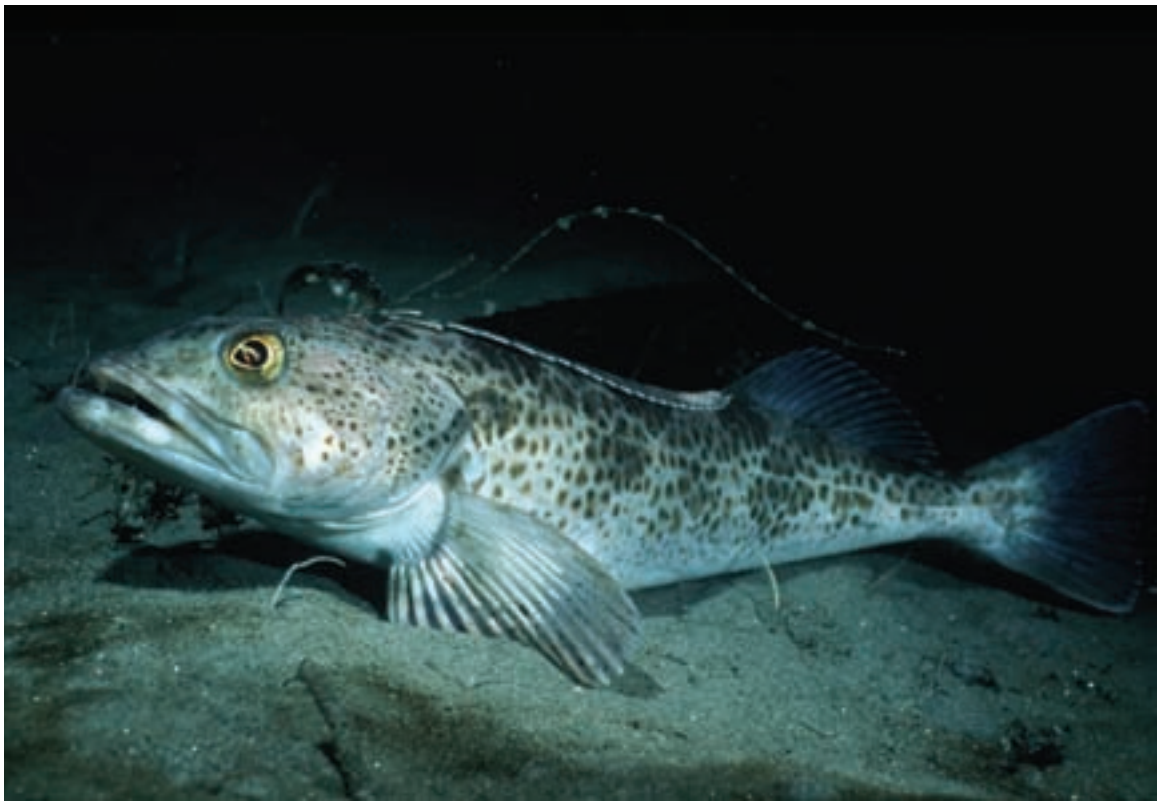
- During the course of the year, in-season tracking of progress towards harvest limits may show that these limits will be reached or exceeded before the end of the established fishing season.

**Cowcod (*Sebastes levis*) among anemones. Fishery scientists belive current cowcod populations are extremely low.** *Photo © Robert Lea*

In each of these cases, when fishery managers have access to data that show that the current sport fishing regulations are not sufficient to keep the annual sport catch within harvest limits, they may take action to reduce the sport catch. This action may include in-season changes to shorten or close fishing seasons, changes or implementation of depth restrictions, reduction in bag limits, and/or increases in the to in-season changes – knowingly and willfully exceeding annual harvest limits established for overfished species – is prohibited by law.

### For the Future

State and federal fishery managers are working to improve the management of the marine recreational fisheries of California. NOAA Fisheries is making changes to the federal management process to stabilize the groundfish fishery. The PFMC is moving to a biennial management cycle for the 2005 and 2006 seasons, as opposed to the annual cycle



**Lingcod.** *Photo © Mark Cortright*

that has been used prior to 2005. Recent stock assessments have also shown that several overfished species seem to be recovering faster than anticipated. With the advent of the CRFS, fishery managers will have access to better recreational fishery data, which should improve the accuracy and precision of in-season recreational catch estimates, and also lead to better pre-season catch models. These agencies are also working to improve public involvement in the fishery management process, and developing new ways to keep saltwater anglers informed.

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## Visit these web sites for more information:

**Department of Fish and Game's Marine Region:** www.dfg.ca.gov/mrd

**NOAA Fisheries:** www.nmfs.noaa.gov

**Pacific Fishery Management Council:** www.pcouncil.org

**Pacific States Marine Fisheries Commission:** www.psmfc.org

# How well do you know your rockfish? Take this quiz and find out

*By Mary Patyten*

Rockfish can be difficult to identify. No one disputes that, not even scientists who have spent their lives studying the genus *Sebastes*! How good are you at identifying different species of rockfish? The rockfishes pictured here represent some of the more common species you might see on a typical day of fishing off the central or Southern California coast, although many species are also found further north. Take the rockfish quiz, and see how well you know your rockfishes!

1 This fish is something of a celebrity. Caught on April 3, 2003 near Carrington Point at Santa Rosa Island, it was tagged, released, and then recaptured over a year and a half later at the same location! Biologists call this tendency to stay in one area "residential" behavior. This species is thought to stake out a home territory of about 110 square feet on rocky sea floor, although this can vary in different areas. The color of the fish in this photograph is a bit unusual, but don't let that fool you. What species of rockfish is it?

2 This fish was taken in 190 feet of water at Short Bank in Santa Monica Bay. This dwarf species (yes, that's a hint!) of rockfish is a common sight for recreational fishermen in Southern California, and has also made inroads into the area's live fish markets. What species of rockfish is it?

3 This fish, another dwarf species that nibbles on recreational fishermen's hooks, was taken off Santa Barbara. Due to its very small size, it's often discarded by recreational fishermen and is not even found in live fish markets. What species of rockfish is it?

4 This fish, although small, is not a dwarf: it's a young rockfish, taken off Goleta Pier in Southern California. Its grown-up counterparts are much sought-after by both recreational and commercial fishermen. South of Cape Mendocino, adults of this species have a recreational daily bag limit of one fish and a minimum size limit of 10 inches total length (That's a BIG hint! But, then, immature rockfishes aren't exactly easy to identify!). What species of rockfish is it?

5 And finally this fish, taken off Santa Rosa Island in approximately 120 feet of water. It has been very popular with recreational fishermen. Catch rates plummeted between 1980 and 1996 due to fishing pressure and oceanographic regime changes that did not favor the survival of young fish. What species of rockfish is it?

For more information about fish you may find off the California coast, go to the Fish Identification Guides Web page on the DFG Marine Region Web site at www.dfg.ca.gov/mrd/fishid.html.

## Answers:

1. Copper rockfish, *Sebastes caurinus*. Common names include *chucklehead*, and *whitebelly rockfish*. This fish is often an olive/dark brown/coppery pink color. If the red color had you thinking 'vermilion rockfish,' look at the dorsal fin: long spines, deeply incised (compared to a vermilion rockfish), and none of the fins are edged in black, as you often find in the vermilion. According to rockfish authorities, bright-red copper rockfish are common off California. Daily recreational bag limit: not more than 10 in combination with other RCG Complex* species. Maximum recorded length: 26 inches. Range: Gulf of Alaska to Baja California.

*DFG photo by Ed Roberts*

2. Honeycomb rockfish, *Sebastes umbrosus*. Common names include *crotch cricket*, and *starry-eye*. The green edging on the scales produces a distinctive honeycomb pattern. Daily recreational bag limit: not more than 10 in combination with other RCG Complex* species. Maximum recorded length: 11.22 inches. Range: central California to southern Baja California.

3. Calico rockfish, *Sebastes dalli*. Named after the Smithsonian zoologist William H. Dall. Identified by reddish-brown bars slanting obliquely on a brown or yellowish-green body. The tail shows brown bars that run alongside the fin rays. Daily recreational bag limit: not more than 10 in combination with other RCG Complex* species. Maximum recorded length: 8 inches. Range: San Francisco to central Baja California, more common south of Pt. Arguello.

4. Bocaccio, *Sebastes paucispinis*. Common names include *salmon grouper*, and *mini-grouper*. Young bocaccio are frequently taken in significant numbers off piers in central California. The large mouth extending almost past the eye is one characteristic that identifies it as a bocaccio. Daily recreational bag limit: north of 40°10′ N. latitude: two fish; south of 40°10′ N. latitude: one fish. Maximum recorded length: 36 inches. Range: Alaskan peninsula to Punta Blanca, Baja California.

5. Olive rockfish, *Sebastes serranoides*. Common names include *johnny bass* and *kelp bass*. This species is often confused with yellowtail rockfish. Olive rockfish may be distinguished by the lack of dark speckling on the sides, and an often more elongate, bass-shaped body. Daily recreational bag limit: not more than 10 in combination with other RCG Complex* species. Maximum recorded length: 24 inches. Range: southern Oregon to San Benitos Island, Baja California.

** RCG Complex: Includes all species of rockfish, cabezon and greenlings*

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*DFG photos by Ed Roberts*

*Juvenile bocaccio by Tim Burgess*